Brain Injury in the Medical Malpractice Case

By Ellen B. Flynn

Negligent health care can cause brain injury in many different ways. Whether from administering too much anesthesia; failing to protect a patient's airway during a procedure; failing to monitor a patient on pain medications that can cause the patient to lose their drive to breathe; or from failing properly to manage anticoagulation medications, resulting in hemorrhage or stroke – no matter how they arise, brain injuries from negligent medical care can lead to a lifetime of frustration and diminished capacity to participate in normal life.

This article addresses how to evaluate cases of brain injury arising in the healthcare setting, and how to capture the full impact of the brain injury for your client's case.

Time is Brain...Every Second Matters

Whenever the brain's supply of oxygen is interrupted, every second matters. All organs require oxygen, but the brain is particularly sensitive to oxygen deprivation. A significant shortage of oxygen in the brain, called *hypoxia*, for even just a few minutes, can be fatal.

Establishing how many minutes and seconds before hypoxia is recognized; identifying what actions might have been taken to prevent hypoxia, or after hypoxia has been recognized; what actions might have been taken to restore the brain's oxygen supply; are all critical to understanding whether a patient's brain injury resulted from medical malpractice.

Anesthesia

Cases involving hypoxia can frequently arise from the administration of anesthesia. When the patient's airway and intake of oxygen are no longer within the patient's own control, anesthesiologists are charged with the responsibility of maintaining them. As such, anesthesiologists must monitor a patient's vital signs carefully for any adverse effects of sedative medications, and must maintain a patent airway while the patient is under anesthesia and unable to protect their own airway themselves.

Even in hospital systems with sophisticated electronic medical records, the anesthesia record is typically written by hand on a blank form specially prepared for that purpose. The anesthesia record will include a timed graph of vital signs and handwritten notes generated by the anesthesiologist about any events that transpired during the procedure. Pulse oximetry readings (SpO2), respiratory rates, and blood pressures are documented in the anesthesia record, as well as when the anesthesia started and ended and other significant events in the operating room. If a patient goes into cardiorespiratory arrest in the operating room, the time of the code is first documented in the anesthesia record.

When a patient goes into cardiorespiratory arrest and a code is called, a separate code sheet is also typically generated by a nurse or other practitioner who has been assigned the role of recorder for the code. A code sheet includes important vital sign information and also documents the order in which actions were taken during the code, and the time when those actions were taken. Close scrutiny of anesthesia records and code sheets can identify gaps in time when perhaps the patient's oxygenation was not properly monitored and hypoxia may have occurred.

Timelines created from the medical record and eventual expert witness testimony can explain why the brain injury occurred under these circumstances.

A drop in oxygen can be caused by an airway issue, such as an obstructed airway that prevents oxygen from reaching the lungs, a tracheal tube that is misplaced in the esophagus instead of the trachea, or the aspiration of vomit into the airway. The anesthesiologist is responsible for ensuring that the airway is protected at all times. Over-sedation also can cause a decreased drive to breathe resulting in hypoxia. A pneumothorax could cause the patient's lung to collapse, which could also lead to a decrease of oxygen. In spinal anesthesia cases, the migration of anesthesia into the wrong area, such as with a "high spinal," can cause paralysis in the chest instead of where it was intended, leading to hypoxia. When these things cause a reduction of oxygen to the brain, brain injury or death can readily occur. Without proper respiratory circulation, there is generally only enough oxygen stored in the blood to sustain the brain for three minutes or less without hypoxic injury.

Pulse oximeters are regularly utilized to monitor oxygen saturations in and outside of the operating room. Pulse oximeters display numbers representing the patient's current oxygen saturation; these devices also provide an audible signal that changes pitch when oxygen saturation declines. A fall in pitch indicates falling oxygen saturation. On many pulse oximeters, however, it is possible to turn down the volume of these audible warnings, or even turn them off. Thus, it is important to discover whether health care providers identified a drop in oxygen because they heard the signal, or because they saw clinical evidence of hypoxia, which can be noticeable minutes after an audible signal otherwise might have alerted the providers to the existence of a problem. Whenever a pulse oximeter is utilized, the signal settings should be checked for this reason.

In addition, many pulse oximeters capture information only every 20 to 30 seconds, and so when oxygen saturations fall, there can be a delay in the alarm. Thus, prompt response to an alarm is important. Determining whether a health care provider responded to an alarm, or became aware of the issue only after clinical signs of hypoxia were noticed, is worth discovering.

Although pulse oximetry is a simple technology that can detect low levels of oxygen in the blood, it is only effective if it is properly utilized, and if appropriate actions are immediately taken to maintain oxygen levels in the event of hypoxia. During anesthesia the oxygen saturation should always be maintained between 95 percent and 100 percent. If oxygen saturation falls below 94 percent, the patient is considered hypoxic and must be treated quickly. A saturation of less than 90 percent during a surgical procedure is a clinical emergency.

Some pulse oximeters have the ability to save, download and print information. Other devices send information directly to the nurse's station. Such information might not appear in the patient's chart, so every health care provider should be asked whether they could capture data from pulse oximeters, and whether they did so for inclusion in the patient's chart. In addition, it is important to confirm whether any pulse oximetry information in the patient's chart was documented contemporaneously, as opposed to the health care provider having recreated the information by cycling through the monitor's readings after an event.

General anesthesia and regional anesthesia alike can lead to respiratory arrest. In the regional anesthesia case, patients are given sedative medications such as Versed and/or Fentanyl, so that the patient can tolerate administration of a regional anesthetic (nerve block) through an ultrasound-guided needle. Regional anesthesia is typically used for surgical procedures on the limbs. The benefits of regional anesthesia are two-fold: the patient does not suffer a post-anesthesia "hangover" at the same level as a general anesthesia, and regional anesthesia can provide post-operative pain control.[1]

However, regional anesthesia is certainly not risk-free. Regional anesthesia is typically initiated outside of an operating room, in the preoperative area by an anesthesiologist who may be administering regional anesthesia to many patients simultaneously prior to their scheduled operating room time. An anesthesiologist providing sedative medications and regional anesthetic in the preoperative area might hand a patient off to another anesthesiologist who would monitor the patient during surgery. Close monitoring of patients in the preoperative area can present a challenge for the anesthesiologist as one provider must keep track of multiple patients at once before those patients move to their respective operating rooms.

Pain Control Causing Depressed Drive to Breathe

PCA (patient-controlled analgesia) pumps are another common source of respiratory depression and hypoxic events. PCA pumps are designed to titrate opioid pain

1 A hospital may bill for only one anesthesiologist, i.e., the anesthesiologist who bills for time in the operating room, unless regional anesthesia will be used postoperatively for pain control. In this way, regional anesthesia might generate additional revenue for the hospital. Confirm that the postoperative pain control requested by the surgeon was regional anesthesia.

medication into a patient's IV-line in response to the patient's pain level. They can be set to provide a baseline dose-per-hour, which is infused automatically by the pump to provide a steady amount of pain control. In addition, the patient might be given a trigger button to administer more pain medication simply by pushing the button; of course, the patient must be sufficiently conscious and in pain in order to push the button, so as to avoid inadvertent over-sedation.

In addition, a PCA pump is typically set so that, even if the button is pushed repeatedly, only one dose of pain medication can be administered every 6 to 10 minutes. Failure to properly adjust the settings on PCA pumps and/or a family member or nurse who believe that a patient needs more pain medication and push the button for the patient, may cause over-sedation, which in turn can depress the patient's drive to breathe.

Opioids are considered a high-alert medication because they can cause significant patient harm when used in error. Thus, many hospitals have written PCA policies that require independent verification by a second health care provider of the patient's identity, the dosage calculations and medication settings, and proper pump settings before an opioid infusion may be commenced through a PCA pump.[2]

Pharmacologists can assist in proving that a buildup of opioid medication led to a patient's arrest by calculating the amount of medication in a patient's system based upon the PCA pump record. Hospitals typically have written policies that require that the PCA pump be "interrogated" after a patient experiences respiratory arrest while on a PCA pump. Interrogation of the pump results in documentation of exactly how the machine was set up, how much pain medicine was administered, how often the button had been pushed for additional doses, and whether the machine locked out the patient from obtaining additional doses of pain medication. Such information can assist in determining whether an equipment failure of some kind may have occurred, or whether the machine was properly set up to administer medications as ordered.

In any case where the patient suffered a respiratory arrest while on a PCA pump, the interrogation record of the PCA pump should be obtained and scrutinized. If the record doesn't exist, then a hospital policy may have been violated, resulting in the destruction of (or at least a failure to gather) critical evidence.

2 See, Lippincott, Nursing Procedures, 7th Ed., p. 593-594

Response to the Cardio-Respiratory Arrest

Significant hypoxia can result in cardiorespiratory arrest. Failure to respond appropriately to such an arrest can lead to a patient's brain injury.

Code teams must be paged or otherwise called into action, and they must be able to respond timely to a page. Again, hospitals typically have written policies or procedures relating to code teams, which will include: who is on the team, how they are to be contacted, who is responsible for bringing the crash cart with appropriate medications, who is responsible for stocking the crash cart, where the crash cart is to be maintained, how fast the code team is expected to be able to respond, and how the code is run and documented.

Hospital policies also typically reference the ACLS Guidelines with respect to the administration of medications in various types of codes. ACLS guidelines were revised recently to provide health care providers with a treatment algorithm that minimizes brain and organ injury during management of a cardiorespiratory arrest. The order in which arrest medications are administered, and the efficacy of Atropine, are important elements of this new algorithm. Always check for the ACLS Guideline that was in effect at the time of the event.

Defining Damages

Following a hypoxic arrest or other event that causes brain injury, there may or may not be clear evidence of the injury in the medical record. Just because a patient is discharged without having been diagnosed with a brain injury, or even referred for a neurology consult, does not mean that the patient has not suffered a significant injury.

The signs and symptoms of brain injury range from problems with short-term memory to coma, and everything in between. A complete inability to speak, motor impairment, vision field cuts, and regression in intelligence and social acuity, are just a few of the symptoms of brain injury. Defining the exact nature of a patient's impairment is not necessarily part of the offending hospital's discharge plan.

It is also important to remember that radiographic imaging does not always clearly describe brain injury. Review of any available radiology studies can be an important investment – where one radiologist may simply identify "mild parenchymal volume loss and mild increased T2 signal at the bilateral hippocampi structures," which is a non-specific finding that could be related to an anoxic brain injury. A second radiology read might suggest the MRI of the brain "showed evidence of brain damage to an area of the brain on both sides (hippocampus) important in memory functioning in a pattern suggesting it was due to the loss of oxygen the brain experienced during the arrest." Both of these opinions could be rendered looking at the same MRI study!

Neuropsychological assessments also help to define for a jury how important those brain cells were to your client, as well as the client's inability to return to everyday functions at home and at work. Even in cases where radiology studies show stark differences in brain structure before and after an injury, neuropsychological testing translates those brain injuries into changes in day-to-day life experiences and functions.

Brain injuries can change a person's cognition, behavior and personality. Aspects of cognitive functioning assessed during neuropsychological testing can include orientation, new-learning/memory, intelligence, language, visual perception, verbal comprehension, perceptual reasoning, working memory, processing speed, and executive function. Such an assessment also can buttress other evidence of the cause and location of brain injury. Neuropsychological testing is also critical to define the nature and significance of the injury for making lifetime decisions about where and how to live and work, the management of finances, and devising a rehabilitation care program.

A wide variety of tests can be administered to assess the impact of brain injury.

Finding those areas that are affected as confirmed through testing, and correlating them to your client's complaints are critical for your client's credibility and to provide the "so what" for any so-called "minor" brain injury. These may include short-term memory loss, difficulty recalling appointments or whether they have taken their medications, aphasia, difficulty finding words, inability to stay focused on a task, inability to remember whether the stove is on or off, inability to perform multiple tasks at once as required when driving a car. When a neuropsychologist can opine that the evaluation is consistent with the DSM-V diagnosis of Major Neurocognitive Disorder secondary to Hypoxia – Anoxic Injury, it is very powerful evidence.

Moreover, people with brain injury can suffer depression, anxiety, diminished self-care skill, diminished socialization skills and diminished independence despite suffering a relatively minor brain injury. The neuropsychologist is an expert best suited to explain the significance of these symptoms to a jury.

The Test of Memory Malingering (TOMM) is a forced-choice memory recognition test that is sensitive to malingering, low effort, low motivation, or feigned cognitive symptoms. If you have a client assessed, consider whether to request the TOMM or an equivalent, so that the neuropsychologist can opine that your client showed no indications of symptom exaggeration, malingering, or low motivation – in anticipation that defense experts will weave those themes into their own testimony if they can.

Life Care Planning for Brain Injury

The life care plan for a brain-injured client cannot be limited simply to the immediately apparent effects of brain injury. Long-term consequences must be included in any comprehensive assessment of needs and damages.

The long-term consequences of brain injuries are a hot topic in recent medical literature. For instance, a July 2015 study published in JAMA found that not only was there an acute decline in cognitive function after brain injury caused by stroke, but also found a persistent continuing cognitive decline for years after injury. Faster declines in global cognition, executive function skills, were noted in patients who had suffered brain injury from stroke.[3]

Earlier onset of dementia, and a corresponding need for earlier support with assisted living as the patient ages, is an additional foreseeable consequence of brain injury that will greatly impact a well-prepared life care plan. Daily care needs, such as assistance with cooking, dressing, shopping, finances, medical management and medication management, even if not needed immediately, may be needed sooner because of brain injury.

Conclusion

When health care falls below the accepted standard of care, brain injury is among the most devastating consequences. Identifying the presence of brain injury, documenting its effects, and presenting the consequences of that injury to the jury, are all critical to maximizing the client's case.

Biography

Ellen B. Flynn is a partner in the law firm of Dugan, Babij, Tolley & Kohler LLC, in Timonium, Maryland. She received a B.S. in Business Administration from the University of Richmond, and obtained her J.D. from the Catholic University of America, Columbus School of Law. Ms. Flynn is an active member of the MAJ Board of Governors. She is admitted to practice law in Federal and State Courts of Maryland, Connecticut and the District of Columbia. Her primary practice area involves representing those injured by medical negligence. She lives with her husband and two daughters in Ellicott City, Maryland.

3 Trajectory of Cognitive Decline After Incident of Stroke, Lavine, DA, et al., JAMA 2015;314(1):41-51. Doi:10.1001/jama.2015.6968